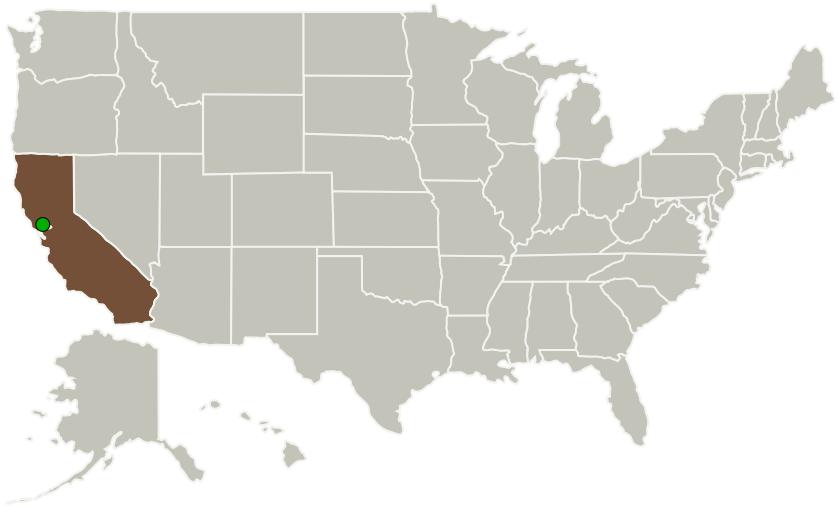
Ultra-Precision Manufacturing Technology for Miniature & Complex-Form Integrated Opto-Mechanical Structures for Sensors Payloads, Phase I

Completed Technology Project (2011 - 2011)

Project Introduction

We propose to demonstrate ultra precision manufacturing of components for NASA payloads, specifically for electro-optical and infrared sensors that are used in Earth, atmosphere, oceans, and planetary missions. We will integrate the optical and mechanical element and form lighter, more efficient sensor components, capable of replacing traditional multi-element higher weight and more expensive optics. The ability to take advantage of new manufacturing capabilities including micro and nano fabrication, with surface quality in the sub micrometer, and advanced metrology, allows us to develop more efficient sensor payloads, that will result is smaller, lighter less expensive EO and IR sensor payloads. We have selected to manufacture one specific optical system for Phase-I that will demonstrate the concept and increase confidence in the process. In Phase-II we will fabricate additional optical elements. Together with the Phase-I optical system, these element will be assembled into a complete sensor system and the sensor performance will be characterized and compared with present NASA technology in terms of overall optical efficiency (that affects sensor sensitivity, & SNR performance) as well as size, weight, and cost. If successful, these optical components can be introduced into future NASA mission planning.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Opto-Knowledge Systems, Inc.(OKSI)	Lead Organization	Industry	Torrance, California
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations
California

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138552)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Opto-Knowledge Systems, Inc. (OKSI)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Nahum Gat

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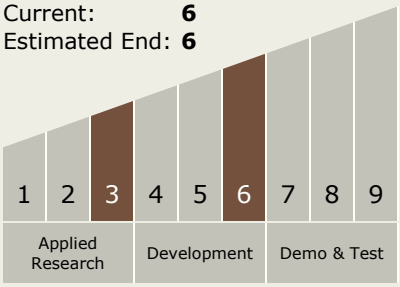
Technology Maturity (TRL)

Start: **3**
Current: **6**
Estimated End: **6**



Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.1 Optical Communications
    - TX05.1.6 Optimetrics

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System